

10/587804

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SEQUENCE LISTING

<110> Maxygen Holdings Ltd.
Maxygen ApS
Bouquin, Thomas

<120> Regulated Stop Codon Readthrough

<130> 0279wo310

<140> PCT/DK2005/000070

<141> 2005-01-28

<150> US 60/540,820

<151> 2004-01-30

<150> US 60/631,306

<151> 2004-11-29

<160> 27

<170> PatentIn version 3.2

<210> 1

<211> 1524

<212> DNA

<213> Artificial

<220>

<223> PC-GPI cassette

<220>

<221> exon

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tcc	ggc	aca	cca	gct	cct	ctt	gac	tca	gtg	ttc	tcc	agc	agc	gag	cgt	96
Ser	Gly	Thr	Pro	Ala	Pro	Leu	Asp	Ser	Val	Phe	Ser	Ser	Ser	Glu	Arg	
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gcc	cac	cag	gtg	ctg	cgc	atc	cgc	aaa	cgt	gcc	aac	tcc	ttc	ctg	gag	144
Ala	His	Gln	Val	Leu	Arg	Ile	Arg	Lys	Arg	Ala	Asn	Ser	Phe	Leu	Glu	
		35					40					45				

gag	ctc	cgt	cac	agc	agc	ctg	gag	cgg	gag	tgc	ata	gag	gag	atc	tgt	192
Glu	Leu	Arg	His	Ser	Ser	Leu	Glu	Arg	Glu	Cys	Ile	Glu	Glu	Ile	Cys	
	50					55					60					

gac	ttc	gag	gag	gcc	aag	gaa	att	ttc	caa	aat	gtg	gat	gac	aca	ctg	240
Asp	Phe	Glu	Glu	Ala	Lys	Glu	Ile	Phe	Gln	Asn	Val	Asp	Asp	Thr	Leu	
65					70					75					80	

gcc	ttc	tgg	tcc	aag	cac	gtc	gac	ggt	gac	cag	tgc	ttg	gtc	ttg	ccc	288
Ala	Phe	Trp	Ser	Lys	His	Val	Asp	Gly	Asp	Gln	Cys	Leu	Val	Leu	Pro	
				85				90						95		

ttg	gag	cac	ccg	tgc	gcc	agc	ctg	tgc	tgc	ggg	cac	ggc	acg	tgc	atc	336
Leu	Glu	His	Pro	Cys	Ala	Ser	Leu	Cys	Cys	Gly	His	Gly	Thr	Cys	Ile	
			100					105					110			

gac	ggc	atc	ggc	agc	ttc	agc	tgc	gac	tgc	cgc	agc	ggc	tgg	gag	ggc	384
Asp	Gly	Ile	Gly	Ser	Phe	Ser	Cys	Asp	Cys	Arg	Ser	Gly	Trp	Glu	Gly	
		115					120					125				

cgc Arg	ttc Phe 130	tgc Cys	cag Gln	cgc Arg	gag Glu	gtg Val 135	agc Ser	ttc Phe	ctc Leu	aat Asn	tgc Cys 140	tcg Ser	ctg Leu	gac Asp	aac Asn	432
ggc Gly 145	ggc Gly	tgc Cys	acg Thr	cat His	tac Tyr 150	tgc Cys	cta Leu	gag Glu	gag Glu	gtg Val 155	ggc Gly	tgg Trp	cgg Arg	cgc Arg	tgt Cys 160	480
agc Ser	tgt Cys	gcg Ala	cct Pro	ggc Gly 165	tac Tyr	aag Lys	ctg Leu	ggg Gly	gac Asp 170	gac Asp	ctc Leu	ctg Leu	cag Gln	tgt Cys 175	cac His	528
ccc Pro	gca Ala	gtg Val 180	aag Lys	ttc Phe	cct Pro	tgt Cys	ggg Gly	agg Arg 185	ccc Pro	tgg Trp	aag Lys	cgg Arg	atg Met 190	gag Glu	aag Lys	576
aag Lys	cgc Arg	agt Ser 195	cac His	ctg Leu	aaa Lys	cga Arg	gac Asp 200	aca Thr	gaa Glu	gac Asp	caa Gln	gaa Glu 205	gac Asp	caa Gln	gta Val	624
gat Asp	ccg Pro 210	cgg Arg	ctc Leu	att Ile	gat Asp	ggg Gly 215	aag Lys	atg Met	acc Thr	agg Arg	cgg Arg 220	gga Gly	gac Asp	agc Ser	ccc Pro	672
tgg Trp 225	cag Gln	gtg Val	gtc Val	ctg Leu	ctg Leu 230	gac Asp	tca Ser	aag Lys	aag Lys	aag Lys 235	ctg Leu	gcc Ala	tgc Cys	ggg Gly	gca Ala 240	720
gtg Val	ctc Leu	atc Ile	cac His	ccc Pro 245	tcc Ser	tgg Trp	gtg Val	ctg Leu	aca Thr 250	gcg Ala	gcc Ala	cac His	tgc Cys	atg Met 255	gat Asp	768
gag Glu	tcc Ser	aag Lys	aag Lys 260	ctc Leu	ctt Leu	gtc Val	agg Arg	ctt Leu 265	gga Gly	gag Glu	tat Tyr	gac Asp	ctg Leu 270	cgg Arg	cgc Arg	816
tgg Trp	gag Glu	aag Lys 275	tgg Trp	gag Glu	ctg Leu	gac Asp	ctg Leu 280	gac Asp	atc Ile	aag Lys	gag Glu	gtc Val 285	ttc Phe	gtc Val	cac His	864
ccc Pro	aac Asn 290	tac Tyr	agc Ser	aag Lys	agc Ser	acc Thr 295	acc Thr	gac Asp	aat Asn	gac Asp	atc Ile 300	gca Ala	ctg Leu	ctg Leu	cac His	912
ctg Leu 305	gcc Ala	cag Gln	ccc Pro	gcc Ala	acc Thr 310	ctc Leu	tcg Ser	cag Gln	acc Thr	ata Ile 315	gtg Val	ccc Pro	atc Ile	tgc Cys	ctc Leu 320	960
ccg Pro	gac Asp	agc Ser	ggc Gly	ctt Leu 325	gca Ala	gag Glu	cgc Arg	gag Glu	ctc Leu 330	aat Asn	cag Gln	gcc Ala	ggc Gly	cag Gln 335	gag Glu	1008
acc Thr	ctc Leu	gtg Val	acg Thr 340	ggc Gly	tgg Trp	gga Gly	tat Tyr	cac His 345	agc Ser	agc Ser	cga Arg	gag Glu	aag Lys 350	gag Glu	gcc Ala	1056
aag Lys	aga Arg	aac Asn 355	cgc Arg	acc Thr	ttc Phe	gtc Val	ctc Leu 360	aac Asn	ttc Phe	atc Ile	aag Lys	att Ile 365	ccc Pro	gtg Val	gtc Val	1104
ccg Pro	cac His 370	aat Asn	gag Glu	tgc Cys	agc Ser	gag Glu 375	gtc Val	atg Met	agc Ser	aac Asn	atg Met 380	gtg Val	tct Ser	gag Glu	aac Asn	1152
atg Met 385	ctg Leu	tgt Cys	gcg Ala	ggc Gly	atc Ile 390	ctc Leu	ggg Gly	gac Asp	cgg Arg	cag Gln 395	gat Asp	gcc Ala	tgc Cys	gag Glu	ggc Gly 400	1200
gac	agt	ggg	ggg	ccc	atg	gtc	gcc	tcc	ttc	cac	ggc	acc	tgg	ttc	ctg	1248

Asp	Ser	Gly	Gly	Pro	Met	Val	Ala	Ser	Phe	His	Gly	Thr	Trp	Phe	Leu	
				405					410					415		
gtg	ggc	ctg	gtg	agc	tgg	ggt	gag	ggc	tgt	ggg	ctc	ctt	cac	aac	tac	1296
Val	Gly	Leu	Val	Ser	Trp	Gly	Glu	Gly	Cys	Gly	Leu	Leu	His	Asn	Tyr	
			420					425					430			
ggc	ggt	tac	acc	aaa	gtc	agc	cgc	tac	ctc	gac	tgg	att	cat	ggg	cac	1344
Gly	Val	Tyr	Thr	Lys	Val	Ser	Arg	Tyr	Leu	Asp	Trp	Ile	His	Gly	His	
		435					440					445				
atc	aga	gac	aag	gaa	gcc	ccc	cag	aag	agc	tgg	gca	cct	ctg	gaa	ccc	1392
Ile	Arg	Asp	Lys	Glu	Ala	Pro	Gln	Lys	Ser	Trp	Ala	Pro	Leu	Glu	Pro	
	450					455					460					
acg	tac	tgc	gac	ctc	gcc	cct	ccc	gct	ggc	acg	acc	gat	gcc	gct	cac	1440
Thr	Tyr	Cys	Asp	Leu	Ala	Pro	Pro	Ala	Gly	Thr	Thr	Asp	Ala	Ala	His	
	465				470					475					480	
cct	ggc	cgg	agc	gtc	gtg	cct	gcc	ctc	ctg	cct	ctg	ctc	gcc	ggg	acc	1488
Pro	Gly	Arg	Ser	Val	Val	Pro	Ala	Leu	Leu	Pro	Leu	Leu	Ala	Gly	Thr	
				485					490					495		
ctc	ctg	ctc	ctg	gaa	acc	gct	acc	gct	ccc	tagtaa						1524
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<220>
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 <223> 1384-1386: TAA stop codon

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1				5					10					15			
tcc	ggc	aca	cca	gct	cct	ctt	gac	tca	gtg	ttc	tcc	agc	agc	gag	cgt		96
Ser	Gly	Thr	Pro	Ala	Pro	Leu	Asp	Ser	Val	Phe	Ser	Ser	Ser	Glu	Arg		
			20					25					30				
gcc	cac	cag	gtg	ctg	cgc	atc	cgc	aaa	cgt	gcc	aac	tcc	ttc	ctg	gag		144
Ala	His	Gln	Val	Leu	Arg	Ile	Arg	Lys	Arg	Ala	Asn	Ser	Phe	Leu	Glu		
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gag	ctc	cgt	cac	agc	agc	ctg	gag	cgg	gag	tgc	ata	gag	gag	atc	tgt		192
Glu	Leu	Arg	His	Ser	Ser	Leu	Glu	Arg	Glu	Cys	Ile	Glu	Glu	Ile	Cys		
	50					55				60							
gac	ttc	gag	gag	gcc	aag	gaa	att	ttc	caa	aat	gtg	gat	gac	aca	ctg		240
Asp	Phe	Glu	Glu	Ala	Lys	Glu	Ile	Phe	Gln	Asn	Val	Asp	Asp	Thr	Leu		
	65				70				75						80		
gcc	ttc	tgg	tcc	aag	cac	gtc	gac	ggt	gac	cag	tgc	ttg	gtc	ttg	ccc		288
Ala	Phe	Trp	Ser	Lys	His	Val	Asp	Gly	Asp	Gln	Cys	Leu	Val	Leu	Pro		
				85				90						95			
ttg	gag	cac	ccg	tgc	gcc	agc	ctg	tgc	tgc	ggg	cac	ggc	acg	tgc	atc		336
Leu	Glu	His	Pro	Cys	Ala	Ser	Leu	Cys	Cys	Gly	His	Gly	Thr	Cys	Ile		

100							105					110					
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cgc Arg	ttc Phe 130	tgc Cys	cag Gln	cgc Arg	gag Glu	gtg Val 135	agc Ser	ttc Phe	ctc Leu	aat Asn	tgc Cys 140	tcg Ser	ctg Leu	gac Asp	aac Asn	432	
ggc Gly 145	ggc Gly	tgc Cys	acg Thr	cat His	tac Tyr 150	tgc Cys	cta Leu	gag Glu	gag Glu	gtg Val 155	ggc Gly	tgg Trp	cgg Arg	cgc Arg	tgt Cys 160	480	
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ccc Pro	gca Ala	gtg Val	aag Lys 180	ttc Phe	cct Pro	tgt Cys	ggg Gly	agg Arg 185	ccc Pro	tgg Trp	aag Lys	cgg Arg	atg Met 190	gag Glu	aag Lys	576	
aag Lys	cgc Arg	agt Ser 195	cac His	ctg Leu	aaa Lys	cga Arg	gac Asp 200	aca Thr	gaa Glu	gac Asp	caa Gln	gaa Glu 205	gac Asp	caa Gln	gta Val	624	
gat Asp	ccg Pro 210	cgg Arg	ctc Leu	att Ile	gat Asp	ggg Gly 215	aag Lys	atg Met	acc Thr	agg Arg	cgg Arg 220	gga Gly	gac Asp	agc Ser	ccc Pro	672	
tgg Trp 225	cag Gln	gtg Val	gtc Val	ctg Leu	ctg Leu 230	gac Asp	tca Ser	aag Lys	aag Lys	aag Lys 235	ctg Leu	gcc Ala	tgc Cys	ggg Gly	gca Ala 240	720	
gtg Val	ctc Leu	atc Ile	cac His	ccc Pro 245	tcc Ser	tgg Trp	gtg Val	ctg Leu	aca Thr 250	gcg Ala	gcc Ala	cac His	tgc Cys	atg Met 255	gat Asp	768	
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tgg Trp	gag Glu	aag Lys 275	tgg Trp	gag Glu	ctg Leu	gac Asp	ctg Leu 280	gac Asp	atc Ile	aag Lys	gag Glu	gtc Val 285	ttc Phe	gtc Val	cac His	864	
ccc Pro	aac Asn 290	tac Tyr	agc Ser	aag Lys	agc Ser	acc Thr 295	acc Thr	gac Asp	aat Asn	gac Asp	atc Ile 300	gca Ala	ctg Leu	ctg Leu	cac His	912	
ctg Leu 305	gcc Ala	cag Gln	ccc Pro	gcc Ala	acc Thr 310	ctc Leu	tcg Ser	cag Gln	acc Thr	ata Ile 315	gtg Val	ccc Pro	atc Ile	tgc Cys	ctc Leu 320	960	
ccg Pro	gac Asp	agc Ser	ggc Gly	ctt Leu 325	gca Ala	gag Glu	cgc Arg	gag Glu	ctc Leu 330	aat Asn	cag Gln	gcc Ala	ggc Gly	cag Gln 335	gag Glu	1008	
acc Thr	ctc Leu	gtg Val	acg Thr 340	ggc Gly	tgg Trp	gga Gly	tat Tyr	cac His 345	agc Ser	agc Ser	cga Arg	gag Glu	aag Lys 350	gag Glu	gcc Ala	1056	
aag Lys	aga Arg	aac Asn 355	cgc Arg	acc Thr	ttc Phe	gtc Val	ctc Leu 360	aac Asn	ttc Phe	atc Ile	aag Lys	att Ile 365	ccc Pro	gtg Val	gtc Val	1104	
ccg Pro	cac His 370	aat Asn	gag Glu	tgc Cys	agc Ser	gag Glu 375	gtc Val	atg Met	agc Ser	aac Asn	atg Met 380	gtg Val	tct Ser	gag Glu	aac Asn	1152	

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gac agt ggg ggg ccc atg gtc gcc tcc ttc cac ggc acc tgg ttc ctg Asp Ser Gly Gly Pro Met Val Ala Ser Phe His Gly Thr Trp Phe Leu 405 410 415	1248
gtg ggc ctg gtg agc tgg ggt gag ggc tgt ggg ctc ctt cac aac tac Val Gly Leu Val Ser Trp Gly Glu Gly Cys Gly Leu Leu His Asn Tyr 420 425 430	1296
ggc gtt tac acc aaa gtc agc cgc tac ctc gac tgg att cat ggg cac Gly Val Tyr Thr Lys Val Ser Arg Tyr Leu Asp Trp Ile His Gly His 435 440 445	1344
atc aga gac aag gaa gcc ccc cag aag agc tgg gca cct taa ctg gaa Ile Arg Asp Lys Glu Ala Pro Gln Lys Ser Trp Ala Pro Leu Glu 450 455 460	1392
ccc acg tac tgc gac ctc gcc cct ccc gct ggc acg acc gat gcc gct Pro Thr Tyr Cys Asp Leu Ala Pro Pro Ala Gly Thr Thr Asp Ala Ala 465 470 475	1440
cac cct ggc cgg agc gtc gtg cct gcc ctc ctg cct ctg ctc gcc ggg His Pro Gly Arg Ser Val Val Pro Ala Leu Leu Pro Leu Leu Ala Gly 480 485 490 495	1488
acc ctc ctg ctc ctg gaa acc gct acc gct ccc tagtaatagt ga Thr Leu Leu Leu Leu Glu Thr Ala Thr Ala Pro 500 505	1533

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tcc ggc aca cca gct cct ctt gac tca gtg ttc tcc agc agc gag cgt Ser Gly Thr Pro Ala Pro Leu Asp Ser Val Phe Ser Ser Ser Glu Arg 20 25 30	96
gcc cac cag gtg ctg cgc atc cgc aaa cgt gcc aac tcc ttc ctg gag Ala His Gln Val Leu Arg Ile Arg Lys Arg Ala Asn Ser Phe Leu Glu 35 40 45	144
gag ctc cgt cac agc agc ctg gag cgg gag tgc ata gag gag atc tgt Glu Leu Arg His Ser Ser Leu Glu Arg Glu Cys Ile Glu Glu Ile Cys 50 55 60	192
gac ttc gag gag gcc aag gaa att ttc caa aat gtg gat gac aca ctg Asp Phe Glu Glu Ala Lys Glu Ile Phe Gln Asn Val Asp Asp Thr Leu 65 70 75 80	240
gcc ttc tgg tcc aag cac gtc gac ggt gac cag tgc ttg gtc ttg ccc	288

Ala	Phe	Trp	Ser	Lys 85	His	Val	Asp	Gly	Asp 90	Gln	Cys	Leu	Val	Leu 95	Pro	
ttg Leu	gag Glu	cac His	ccg Pro 100	tgc Cys	gcc Ala	agc Ser	ctg Leu	tgc Cys 105	tgc Cys	ggg Gly	cac His	ggc Gly	acg Thr 110	tgc Cys	atc Ile	336
gac Asp	ggc Gly	atc Ile 115	ggc Gly	agc Ser	ttc Phe	agc Ser	tgc Cys 120	gac Asp	tgc Cys	cgc Arg	agc Ser	ggc Gly 125	tgg Trp	gag Glu	ggc Gly	384
cgc Arg	ttc Phe 130	tgc Cys	cag Gln	cgc Arg	gag Glu	gtg Val 135	agc Ser	ttc Phe	ctc Leu	aat Asn	tgc Cys 140	tcg Ser	ctg Leu	gac Asp	aac Asn	432
ggc Gly 145	ggc Gly	tgc Cys	acg Thr	cat His	tac Tyr 150	tgc Cys	cta Leu	gag Glu	gag Glu	gtg Val 155	ggc Gly	tgg Trp	cgg Arg	cgc Arg	tgt Cys 160	480
agc Ser	tgt Cys	gcg Ala	cct Pro	ggc Gly 165	tac Tyr	aag Lys	ctg Leu	ggg Gly	gac Asp 170	gac Asp	ctc Leu	ctg Leu	cag Gln	tgt Cys 175	cac His	528
ccc Pro	gca Ala	gtg Val	aag Lys 180	ttc Phe	cct Pro	tgt Cys	ggg Gly	agg Arg 185	ccc Pro	tgg Trp	aag Lys	cgg Arg	atg Met 190	gag Glu	aag Lys	576
aag Lys	cgc Arg	agt Ser 195	cac His	ctg Leu	aaa Lys	cga Arg	gac Asp 200	aca Thr	gaa Glu	gac Asp	caa Gln	gaa Glu 205	gac Asp	caa Gln	gta Val	624
gat Asp	ccg Pro 210	cgg Arg	ctc Leu	att Ile	gat Asp	ggg Gly 215	aag Lys	atg Met	acc Thr	agg Arg	cgg Arg 220	gga Gly	gac Asp	agc Ser	ccc Pro	672
tgg Trp 225	cag Gln	gtg Val	gtc Val	ctg Leu	ctg Leu 230	gac Asp	tca Ser	aag Lys	aag Lys	aag Lys 235	ctg Leu	gcc Ala	tgc Cys	ggg Gly	gca Ala 240	720
gtg Val	ctc Leu	atc Ile	cac His	ccc Pro 245	tcc Ser	tgg Trp	gtg Val	ctg Leu	aca Thr 250	gcg Ala	gcc Ala	cac His	tgc Cys	atg Met 255	gat Asp	768
gag Glu	tcc Ser	aag Lys	aag Lys 260	ctc Leu	ctt Leu	gtc Val	agg Arg	ctt Leu 265	gga Gly	gag Glu	tat Tyr	gac Asp	ctg Leu 270	cgg Arg	cgc Arg	816
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ccc Pro	aac Asn 290	tac Tyr	agc Ser	aag Lys	agc Ser	acc Thr 295	acc Thr	gac Asp	aat Asn	gac Asp	atc Ile 300	gca Ala	ctg Leu	ctg Leu	cac His	912
ctg Leu 305	gcc Ala	cag Gln	ccc Pro	gcc Ala	acc Thr 310	ctc Leu	tcg Ser	cag Gln	acc Thr	ata Ile 315	gtg Val	ccc Pro	atc Ile	tgc Cys	ctc Leu 320	960
ccg Pro	gac Asp	agc Ser	ggc Gly	ctt Leu 325	gca Ala	gag Glu	cgc Arg	gag Glu	ctc Leu 330	aat Asn	cag Gln	gcc Ala	ggc Gly	cag Gln 335	gag Glu	1008
acc Thr	ctc Leu	gtg Val	acg Thr 340	ggc Gly	tgg Trp	gga Gly	tat Tyr	cac His 345	agc Ser	agc Ser	cga Arg	gag Glu	aag Lys 350	gag Glu	gcc Ala	1056
aag Lys	aga Arg	aac Asn	cgc Arg	acc Thr	ttc Phe	gtc Val	ctc Leu	aac Asn	ttc Phe	atc Ile	aag Lys	att Ile	ccc Pro	gtg Val	gtc Val	1104

355	360	365	
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atg ctg tgt gcg ggc atc ctc ggg gac cgg cag gat gcc tgc gag ggc Met Leu Cys Ala Gly Ile Leu Gly Asp Arg Gln Asp Ala Cys Glu Gly 385 390 400			1200
gac agt ggg ggg ccc atg gtc gcc tcc ttc cac ggc acc tgg ttc ctg Asp Ser Gly Gly Pro Met Val Ala Ser Phe His Gly Thr Trp Phe Leu 405 410 415			1248
gtg ggc ctg gtg agc tgg ggt gag ggc tgt ggg ctc ctt cac aac tac Val Gly Leu Val Ser Trp Gly Glu Gly Cys Gly Leu Leu His Asn Tyr 420 425 430			1296
ggc gtt tac acc aaa gtc agc cgc tac ctc gac tgg att cat ggg cac Gly Val Tyr Thr Lys Val Ser Arg Tyr Leu Asp Trp Ile His Gly His 435 440 445			1344
atc aga gac aag gaa gcc ccc cag aag agc tgg gca cct tga ctg gaa Ile Arg Asp Lys Glu Ala Pro Gln Lys Ser Trp Ala Pro Leu Glu 450 455 460			1392
ccc acg tac tgc gac ctc gcc cct ccc gct ggc acg acc gat gcc gct Pro Thr Tyr Cys Asp Leu Ala Pro Pro Ala Gly Thr Thr Asp Ala Ala 465 470 475			1440
cac cct ggc cgg agc gtc gtg cct gcc ctc ctg cct ctg ctc gcc ggg His Pro Gly Arg Ser Val Val Pro Ala Leu Leu Pro Leu Leu Ala Gly 480 485 490 495			1488
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ctg cat cgc cgg cgc cgg gcc aat gcc ttt ctg gaa gag ctc cgc cct Leu His Arg Arg Arg Arg Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro 35 40 45	144
ggc tcc ctg gaa cgc gaa tgc aaa gag gaa cag tgc agc ttt gag gaa Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu 50 55 60	192

gcc Ala 65	cgg Arg	gag Glu	att Ile	ttc Phe	aaa Lys 70	gac Asp	gct Ala	gag Glu	cgg Arg	acc Thr 75	aaa Lys	ctg Leu	ttt Phe	tgg Trp	att Ile 80	240
agc Ser	tat Tyr	agc Ser	gat Asp	ggc Gly 85	gat Asp	cag Gln	tgc Cys	gcc Ala	tcc Ser 90	agc Ser	cct Pro	tgc Cys	cag Gln	aac Asn 95	ggg Gly	288
ggc Gly	tcc Ser	tgc Cys	aaa Lys 100	gac Asp	cag Gln	ctg Leu	cag Gln	agc Ser 105	tat Tyr	atc Ile	tgc Cys	ttc Phe	tgc Cys 110	ctg Leu	cct Pro	336
gcc Ala	ttt Phe	gag Glu 115	ggg Gly	cgc Arg	aat Asn	tgc Cys	gaa Glu 120	acc Thr	cat His	aag Lys	gat Asp	gac Asp 125	cag Gln	ctg Leu	att Ile	384
tgc Cys	gtc Val 130	aac Asn	gaa Glu	aac Asn	ggg Gly	ggc Gly 135	tgc Cys	gag Glu	cag Gln	tac Tyr	tgc Cys 140	agc Ser	gat Asp	cac His	acg Thr	432
ggc Gly 145	acg Thr	aag Lys	cgg Arg	agc Ser	tgc Cys 150	cgc Arg	tgc Cys	cac His	gaa Glu	ggc Gly 155	tat Tyr	agc Ser	ctc Leu	ctg Leu	gct Ala 160	480
gac Asp	ggg Gly	gtg Val	tcc Ser	tgc Cys 165	acg Thr	ccc Pro	acg Thr	gtg Val	gaa Glu 170	tac Tyr	cct Pro	tgc Cys	ggg Gly	aag Lys 175	att Ile	528
ccc Pro	att Ile	cta Leu	gaa Glu 180	aag Lys	cgg Arg	aac Asn	gct Ala	agc Ser 185	aaa Lys	ccc Pro	cag Gln	ggc Gly	cgg Arg 190	atc Ile	gtc Val	576
ggc Gly	ggg Gly	aag Lys 195	gtc Val	tgc Cys	cct Pro	aag Lys	ggg Gly 200	gag Glu	tgc Cys	ccc Pro	tgg Trp	cag Gln 205	gtc Val	ctg Leu	ctc Leu	624
ctg Leu 210	gtc Val	aac Asn	ggg Gly	gcc Ala	cag Gln	ctg Leu 215	tgc Cys	ggc Gly	ggg Gly	acc Thr	ctc Leu 220	atc Ile	aat Asn	acc Thr	att Ile	672
tgg Trp 225	gtc Val	gtg Val	tcc Ser	gcc Ala	gct Ala 230	cac His	tgc Cys	ttc Phe	gat Asp	aag Lys 235	att Ile	aag Lys	aat Asn	tgg Trp	cgg Arg 240	720
aac Asn	ctc Leu	atc Ile	gct Ala	gtg Val 245	ctc Leu	ggc Gly	gaa Glu	cac His	gat Asp 250	ctg Leu	tcc Ser	gag Glu	cat His	gac Asp 255	ggg Gly	768
gac Asp	gaa Glu	cag Gln	tcc Ser 260	cgc Arg	cgg Arg	gtg Val	gct Ala	cag Gln 265	gtc Val	atc Ile	att Ile	ccc Pro	tcc Ser 270	acc Thr	tat Tyr	816
gtg Val	cct Pro	ggc Gly 275	acg Thr	acc Thr	aat Asn	cac His	gat Asp 280	atc Ile	gct Ala	ctg Leu	ctc Leu	cgc Arg 285	ctc Leu	cac His	cag Gln	864
ccc Pro	gtc Val 290	gtg Val	ctc Leu	acc Thr	gat Asp	cac His 295	gtc Val	gtg Val	cct Pro	ctg Leu	tgc Cys 300	ctg Leu	cct Pro	gag Glu	cgg Arg	912
acc Thr 305	ttt Phe	agc Ser	gaa Glu	cgc Arg	acg Thr 310	ctg Leu	gct Ala	ttc Phe	gtc Val	cgc Arg 315	ttt Phe	agc Ser	ctc Leu	gtg Val	tcc Ser 320	960
ggc Gly	tgg Trp	ggc Gly	cag Gln 325	ctg Leu	ctc Leu	gac Asp	cgg Arg	ggc Gly	gct Ala 330	acc Thr	gct Ala	ctc Leu	gag Glu	ctg Leu 335	atg Met	1008
gtg	ctc	aac	gtc	ccc	cgg	ctg	atg	acc	cag	gac	tgc	ctg	cag	cag	tcc	1056

Val	Leu	Asn	Val 340	Pro	Arg	Leu	Met	Thr 345	Gln	Asp	Cys	Leu	Gln 350	Gln	Ser		
cgc Arg	aaa Lys	gtg Val 355	ggg Gly	gac Asp	tcc Ser	ccc Pro	aat Asn 360	atc Ile	acg Thr	gag Glu	tat Tyr	atg Met 365	ttt Phe	tgc Cys	gct Ala	1104	
ggc Gly	tat Tyr 370	agc Ser	gat Asp	ggc Gly	tcc Ser	aag Lys 375	gat Asp	agc Ser	tgc Cys	aag Lys	ggg Gly 380	gac Asp	tcc Ser	ggc Gly	ggg Gly	1152	
ccc Pro 385	cat His	gcc Ala	acg Thr	cac His	tat Tyr 390	cgc Arg	ggg Gly	acc Thr	tgg Trp	tac Tyr 395	ctc Leu	acc Thr	ggg Gly	atc Ile	gtc Val 400	1200	
agc Ser	tgg Trp	ggc Gly	cag Gln	ggc Gly 405	tgc Cys	gcc Ala	acg Thr	gtg Val	ggg Gly 410	cac His	ttt Phe	ggc Gly	gtc Val	tac Tyr 415	acg Thr	1248	
cgc Arg	gtc Val	agc Ser	cag Gln 420	tac Tyr	att Ile	gag Glu	tgg Trp	ctg Leu 425	cag Gln	aag Lys	ctc Leu	atg Met	cgg Arg 430	agc Ser	gaa Glu	1296	
ccc Pro	cgg Arg	ccc Pro 435	ggg Gly	gtg Val	ctc Leu	ctg Leu	cgg Arg 440	gcc Ala	cct Pro	ttc Phe	cct Pro	taa	ctg Leu 445	gaa Glu	ccc Pro	1344	
acg Thr	tac Tyr	tgc Cys 450	gac Asp	ctc Leu	gcc Ala	cct Pro	ccc Pro 455	gct Ala	ggc Gly	acg Thr	acc Thr	gat Asp 460	gcc Ala	gct Ala	cac His	1392	
cct Pro	ggc Gly 465	cgg Arg	agc Ser	gtc Val	gtg Val	cct Pro 470	gcc Ala	ctc Leu	ctg Leu	cct Pro	ctg Leu 475	ctc Leu	gcc Ala	ggg Gly	acc Thr	1440	
ctc Leu 480	ctg Leu	ctc Leu	ctg Leu	gaa Glu	acc Thr 485	gct Ala	acc Thr	gct Ala	ccc Pro	tagtaatagt	ga					1482	

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 <211> 852
 <212> DNA
 <213> Artificial

<220>
 <223> IFN-UGAG cassette

<220>
 <221> exon
 <222> (1)..(840)

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aag Lys	tcc Ser	ata Ile	tgc Cys 20	tct Ser	cta Leu	ggc Gly	tgt Cys	gat Asp 25	ctg Leu	cct Pro	cag Gln	acc Thr	cac His 30	agc Ser	ctg Leu	96	
ggt Gly	aat Asn 35	agg Arg	agg Arg	gcc Ala	ttg Leu	ata Ile 40	ctc Leu	ctg Leu	gca Ala	caa Gln	atg Met	gga Gly 45	aga Arg	atc Ile	tct Ser	144	
cct Pro	ttc Phe 50	tcc Ser	tgc Cys	ctg Leu	aag Lys	gac Asp 55	aga Arg	cat His	gac Asp	ttt Phe	gga Gly 60	ttc Phe	ccc Pro	cag Gln	gag Glu	192	

gag ttt gat ggc aac cag ttc cag aag gct caa gcc atc tct gtc ctc Glu Phe Asp Gly Asn Gln Phe Gln Lys Ala Gln Ala Ile Ser Val Leu 65 70 75 80	240
cat gag atg atc cag cag acc ttc aat ctc ttc agc aca aag gac tca His Glu Met Ile Gln Gln Thr Phe Asn Leu Phe Ser Thr Lys Asp Ser 85 90 95	288
tct gct act tgg gaa cag agc ctc cta gaa aaa ttt tcc act gaa ctt Ser Ala Thr Trp Glu Gln Ser Leu Leu Glu Lys Phe Ser Thr Glu Leu 100 105 110	336
aac cag cag ctg aat gac ctg gaa gcc tgc gtg ata cag gag gtt ggg Asn Gln Gln Leu Asn Asp Leu Glu Ala Cys Val Ile Gln Glu Val Gly 115 120 125	384
gtg gaa gag act ccc ctg atg aat gtg gac tcc atc ctg gct gtg aag Val Glu Glu Thr Pro Leu Met Asn Val Asp Ser Ile Leu Ala Val Lys 130 135 140	432
aaa tac ttc caa aga atc act ctt tat ctg aca gag aag aaa tac agc Lys Tyr Phe Gln Arg Ile Thr Leu Tyr Leu Thr Glu Lys Lys Tyr Ser 145 150 155 160	480
cct tgt gcc tgg gag gtt gtc aga gca gaa atc atg aga tcc ttc tct Pro Cys Ala Trp Glu Val Val Arg Ala Glu Ile Met Arg Ser Phe Ser 165 170 175	528
tta tca aaa att ttt caa gaa aga tta agg agg aag gaa gcg gcc gca Leu Ser Lys Ile Phe Gln Glu Arg Leu Arg Arg Lys Glu Ala Ala Ala 180 185 190	576
ggt gcg ccg gtg ccg tat ccg gac ccg ctg gaa ccg cgt aaa gaa acc Gly Ala Pro Val Pro Tyr Pro Asp Pro Leu Glu Pro Arg Lys Glu Thr 195 200 205	624
gct gct gct aaa ttc gaa cgc cag cac atg gac agc tga ggt aag cct Ala Ala Ala Lys Phe Glu Arg Gln His Met Asp Ser Ser Gly Lys Pro 210 215 220	672
atc cct aac cct ctc ctc ggt ctc gat tct acg ctg gaa ccc acg tac Ile Pro Asn Pro Leu Leu Gly Leu Asp Ser Thr Leu Glu Pro Thr Tyr 225 230 235	720
tgc gac ctc gcc cct ccc gct ggc acg acc gat gcc gct cac cct ggc Cys Asp Leu Ala Pro Pro Ala Gly Thr Thr Asp Ala Ala His Pro Gly 240 245 250 255	768
cgg agc gtc gtg cct gcc ctc ctg cct ctg ctc gcc ggg acc ctc ctg Arg Ser Val Val Pro Ala Leu Leu Pro Leu Leu Ala Gly Thr Leu Leu 260 265 270	816
ctc ctg gaa acc gct acc gct ccc tagtaatatga ga Leu Leu Glu Thr Ala Thr Ala Pro 275	852

<210> 6
 <211> 1482
 <212> DNA
 <213> Artificial

<220>
 <223> FVII variant-UAA-GPI cassette

<220>
 <221> exon

<222> (1)..(1470)

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atg gtc agc cag gcc ctc cgc ctc ctg tgc ctg ctc ctg ggg ctg cag Met Val Ser Gln Ala 5 Leu Arg Leu Leu Cys 10 Leu Leu Leu Gly 15 Leu Gln	48
ggc tgc ctg gct gcc gtc ttc gtc acc cag gag gaa gcc cat ggc gtc Gly Cys Leu Ala 20 Ala Val Phe Val Thr 25 Gln Glu Glu Ala His 30 Gly Val	96
ctg cat cgc cgg cgc cgg gcc aat gcc ttt ctg gaa gag ctc cgc cag Leu His Arg Arg Arg Arg Ala Asn 40 Ala Phe Leu Glu Glu 45 Leu Arg Gln	144
ggc tcc ctg gaa cgc gaa tgc aaa gag gaa cag tgc agc ttt gag gaa Gly Ser 50 Leu Glu Arg Glu Cys 55 Lys Glu Glu Gln Cys 60 Ser Phe Glu Glu	192
gcc cgc gag att ttc gaa gac gaa gaa gaa acc aag ctg ttt tgg att Ala Arg Glu Ile Phe 70 Glu Asp Glu Glu Glu Thr 75 Lys Leu Phe Trp Ile 80	240
agc tat agc gat ggc gat cag tgc gcc tcc agc cct tgc cag aac ggg Ser Tyr Ser Asp Gly 85 Asp Gln Cys Ala Ser 90 Ser Pro Cys Gln Asn 95 Gly	288
ggc tcc tgc aaa gac cag ctg cag agc tat atc tgc ttc tgc ctg cct Gly Ser Cys Lys 100 Asp Gln Leu Gln Ser 105 Tyr Ile Cys Phe Cys 110 Leu Pro	336
gcc ttt gag ggg cgc aat tgc gaa acc cat aag gat gac cag ctg att Ala Phe Glu 115 Gly Arg Asn Cys Glu Thr His Lys Asp 125 Gln Leu Ile	384
tgc gtc aac gaa aac ggg ggc tgc gag cag tac tgc agc gat cac aac Cys Val 130 Asn Glu Asn Gly 135 Cys Glu Gln Tyr Cys 140 Ser Asp His Asn	432
ggc acg aag cgg agc tgc cgc tgc cac gaa ggc tat agc ctc ctg gct Gly Thr Lys Arg Ser Cys 150 Arg Cys His Glu Gly 155 Tyr Ser Leu Leu Ala 160	480
gac ggg gtg tcc tgc acg ccc acg gtg gaa tac cct tgc ggg aag att Asp Gly Val Ser Cys 165 Thr Pro Thr Val Glu Tyr Pro Cys Gly Lys 175 Ile	528
ccc att cta gaa aag cgg aac gcc agc aaa ccc cag ggc cgg atc gtc Pro Ile Leu Glu 180 Lys Arg Asn Ala Ser 185 Lys Pro Gln Gly Arg 190 Ile Val	576
ggc ggg aag gtc tgc cct aag ggg gag tgc ccc tgg cag gtc ctg ctc Gly Gly Lys Val Cys Pro Lys Gly 200 Glu Cys Pro Trp Gln Val Leu Leu	624
ctg gtc aac ggg gcc cag ctg tgc ggc ggg acc ctc atc aat acc att Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu 220 Ile Asn Thr Ile	672
tgg gtc gtg tcc gcc gct cac tgc ttc gat aag att aag aat tgg cgg Trp Val Val Ser Ala 230 His Cys Phe Asp Lys 235 Ile Lys Asn Trp Arg 240	720
aac ctc atc gct gtg ctc ggc gaa cac gat ctg tcc gag cat gac ggc Asn Leu Ile Ala Val 245 Leu Gly Glu His Asp 250 Leu Ser Glu His Asp 255 Gly	768
gac gaa cag tcc cgc cgg gtg gct cag gtc atc att ccc tcc acc tat Asp Glu Gln Ser Arg Arg Val Ala Gln Val Ile Ile Pro Ser Thr Tyr	816

260						265						270						
gtg	cct	ggc	acg	acc	aat	cac	gat	atc	gct	ctg	ctc	cgc	ctc	cac	cag	864		
Val	Pro	Gly	Thr	Thr	Asn	His	Asp	Ile	Ala	Leu	Leu	Arg	Leu	His	Gln			
		275					280					285						
ccc	gtc	aac	ctc	acc	gat	cac	gtc	gtg	cct	ctg	tgc	ctg	cct	gag	cgg	912		
Pro	Val	Asn	Leu	Thr	Asp	His	Val	Val	Pro	Leu	Cys	Leu	Pro	Glu	Arg			
	290					295					300							
acc	ttt	agc	gaa	cgc	acg	ctg	gct	ttc	gtc	cgc	ttt	agc	ctc	gtg	tcc	960		
Thr	Phe	Ser	Glu	Arg	Thr	Leu	Ala	Phe	Val	Arg	Phe	Ser	Leu	Val	Ser			
305					310					315					320			
ggc	tgg	ggc	cag	ctg	ctc	gac	cgg	ggc	gct	acc	gct	ctc	gag	ctg	atg	1008		
Gly	Trp	Gly	Gln	Leu	Leu	Asp	Arg	Gly	Ala	Thr	Ala	Leu	Glu	Leu	Met			
				325					330					335				
gtg	ctc	aac	gtc	ccc	cgg	ctg	atg	acc	cag	gac	tgc	ctg	cag	cag	tcc	1056		
Val	Leu	Asn	Val	Pro	Arg	Leu	Met	Thr	Gln	Asp	Cys	Leu	Gln	Gln	Ser			
			340					345					350					
cgc	aaa	gtg	ggg	gac	tcc	ccc	aat	atc	acg	gag	tat	atg	ttt	tgc	gct	1104		
Arg	Lys	Val	Gly	Asp	Ser	Pro	Asn	Ile	Thr	Glu	Tyr	Met	Phe	Cys	Ala			
		355					360					365						
ggc	tat	agc	gat	ggc	tcc	aag	gat	agc	tgc	aag	ggg	gac	tcc	ggc	ggg	1152		
Gly	Tyr	Ser	Asp	Gly	Ser	Lys	Asp	Ser	Cys	Lys	Gly	Asp	Ser	Gly	Gly			
	370					375					380							
ccc	cat	gcc	acg	cac	tat	cgc	ggg	acc	tgg	tac	ctc	acc	ggg	atc	gtc	1200		
Pro	His	Ala	Thr	His	Tyr	Arg	Gly	Thr	Trp	Tyr	Leu	Thr	Gly	Ile	Val			
385					390				395						400			
agc	tgg	ggc	cag	ggc	tgc	gcc	acg	gtg	ggg	cac	ttt	ggc	gtc	tac	acg	1248		
Ser	Trp	Gly	Gln	Gly	Cys	Ala	Thr	Val	Gly	His	Phe	Gly	Val	Tyr	Thr			
				405					410					415				
cgc	gtc	agc	cag	tac	att	gag	tgg	ctg	cag	aag	ctc	atg	cgg	agc	gaa	1296		
Arg	Val	Ser	Gln	Tyr	Ile	Glu	Trp	Leu	Gln	Lys	Leu	Met	Arg	Ser	Glu			
			420				425						430					
ccc	cgg	ccc	ggg	gtg	ctc	ctg	cgg	gcc	cct	ttc	cct	taa	ctg	gaa	ccc	1344		
Pro	Arg	Pro	Gly	Val	Leu	Leu	Arg	Ala	Pro	Phe	Pro		Leu	Glu	Pro			
		435					440						445					
acg	tac	tgc	gac	ctc	gcc	cct	ccc	gct	ggc	acg	acc	gat	gcc	gct	cac	1392		
Thr	Tyr	Cys	Asp	Leu	Ala	Pro	Pro	Ala	Gly	Thr	Thr	Asp	Ala	Ala	His			
		450					455					460						
cct	ggc	cgg	agc	gtc	gtg	cct	gcc	ctc	ctg	cct	ctg	ctc	gcc	ggg	acc	1440		
Pro	Gly	Arg	Ser	Val	Val	Pro	Ala	Leu	Leu	Pro	Leu	Leu	Ala	Gly	Thr			
	465					470					475							
ctc	ctg	ctc	ctg	gaa	acc	gct	acc	gct	ccc	tagta	atagt	ga				1482		
Leu	Leu	Leu	Leu	Glu	Thr	Ala	Thr	Ala	Pro									
480					485													

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 <213> Artificial

<220>
 <223> modified GPI anchor

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Leu Glu Pro Thr Tyr Cys Asp Leu Ala Pro Pro Ala Gly Thr Thr Asp
1 5 10 15

Ala Ala His Pro Gly Arg Ser Val Val Pro Ala Leu Leu Pro Leu Leu
20 25 30

Ala Gly Thr Leu Leu Leu Leu Glu Thr Ala Thr Ala Pro
35 40 45

<210> 8
<211> 49
<212> PRT
<213> Homo sapiens
<400> 8

Ala Val Gly Gln Asp Thr Gln Glu Val Ile Val Val Pro His Ser Leu
1 5 10 15

Pro Phe Lys Val Val Val Ile Ser Ala Ile Leu Ala Leu Val Val Leu
20 25 30

Thr Ile Ile Ser Leu Ile Ile Leu Ile Met Leu Trp Gln Lys Lys Pro
35 40 45

Arg

<210> 9
<211> 14
<212> PRT
<213> Artificial

<220>
<223> v5 tag

<400> 9

Gly Lys Pro Ile Pro Asn Pro Leu Leu Gly Leu Asp Ser Thr
1 5 10

<210> 10
<211> 6
<212> PRT
<213> Artificial

<220>
<223> His6 tag

<400> 10

His His His His His His
1 5

<210> 11
<211> 9
<212> PRT
<213> Artificial

<220>

<223> FLAG tag

<400> 11

Asp Tyr Lys Asp Asp Asp Asp Lys Gly
1 5

<210> 12

<211> 9

<212> PRT

<213> Artificial

<220>

<223> HA tag

<400> 12

Tyr Pro Tyr Asp Val Pro Asp Tyr Ala
1 5

<210> 13

<211> 10

<212> PRT

<213> Artificial

<220>

<223> c-Myc tag

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Glu Gln Lys Leu Ile Ser Glu Glu Asp Leu
1 5 10

<210> 14

<211> 11

<212> PRT

<213> Artificial

<220>

<223> VSV-G tag

<400> 14

Tyr Thr Asp Ile Glu Met Asn Arg Leu Gly Lys
1 5 10

<210> 15

<211> 11

<212> PRT

<213> Artificial

<220>

<223> HSV tag

<400> 15

Gln Pro Glu Leu Ala Pro Glu Asp Pro Glu Asp
1 5 10

<210> 16

<211> 23

<212> DNA

<213> Artificial

<220>
 <223> PCR primer
 <400> 16
 caccatgtgg cagctcaca gcc 23

<210> 17
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 <212> DNA
 <213> Artificial
 <220>
 <223> PCR primer
 <400> 17
 agaaggcaca gtcgaggctg atc 23

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 <212> DNA
 <213> Artificial
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 <223> PCR primer
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 cggtgaccag tgcttggct tgc 23

<210> 19
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 1 5 10 15

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22